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Laparoscopic Versus Open Repair of Inguinal Hernia: A Prospective Study

Dr. Jayan Stephen	MBBS, DNB (Surg), FCIP, FMAS, FIAGES, MNAMS, FICS Associate Professor of Surgery, Govt Medical College, Trivandrum
Dr. R Parameswaran Unnithan	MBBS, MS, Professor of Surgery, Govt Medical College, Trivandrum,
Dr. Haris T.P	Junior Resident, Govt Medical College, Trivandrum

ABSTRACT

Inguinal hernia is one of the most common surgeries done all over the world. The objective of this study is to compare Laparoscopic and open inguinal hernia repair based on postoperative pain, seroma / hematoma formation, wound infection, number of days of hospital stay and recurrence. Inguinal hernia surgeries done in Thiruvananthapuram Medical College were followed up for a period of one year from March 2015 to March 2016. Postoperative pain, wound infection, duration of hospital stay, hernia recurrence etc were taken into account to compare laparoscopic and open methods of inguinal hernia repair. Patients above the age of 18 years who gave consent were included in the study. 176 patients who were more than 18 years of age were followed up for a period of 1 year. 132 cases of open inguinal hernia repair and 44 cases of laparoscopic repair were chosen after taking consent. All cases that underwent Laparoscopic repair had General Anaesthesia and only 13.6% had postoperative pain. 20% of patients who underwent Spinal anaesthesia had postoperative pain. Postoperative pain, Seroma/ Hematoma formation and postoperative wound discharge were common in open inguinal repair. 36.4% of laparoscopic inguinal hernia repair had less than 3 days of hospital stay. Laparoscopic inguinal hernioplasty has less pain and shorter hospital stay compared to open hernioplasty even though there is no statistically significant results.

KEYWORDS : Inguinal hernia; Open Lichtenstein repair; Laparoscopic inguinal hernia repair.

Introduction:

A hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its containing walls. Hernia can present at any site in the body, but most commonly affects abdominal wall, particularly the inguinal region. Nearly 75% of abdominal wall hernias occur in the groin region. The life time risk of inguinal hernia is nearly 27% in men and 3% in women. 90% of inguinal hernia repairs are done on males while only 10% of females undergo surgery. Indirect hernia is the most common type of inguinal hernia in both men and women. Inguinal hernias may be congenital or acquired. Most adult inguinal hernias are considered acquired defects of the abdominal wall while few studies have confirmed decreased type 1 to type 3 collagen ratios. Weakness of the abdominal wall musculature is the most common cause.

An abdominal wall hernia does not necessarily require repair. Patients may request for surgery for the relief of symptoms of discomfort or for cosmesis. The surgeon should recommend repair when complications are likely, the most worrying being strangulation with bowel obstruction and bowel infarction. Surgery should be offered to younger adult patients as symptoms and complications are likely to occur over time. The most common complications of inguinal hernia repair include bleeding, seroma, wound infection, urinary retention, ileus and injury to adjacent structures. Complications specific to herniorrhaphy and hernioplasty include hernia recurrence, chronic inguinal and pubic pain and injury to the spermatic cord or testis. Complications of transabdominal laparoscopy include urinary retention, paralytic ileus, visceral injuries, vascular injuries and less commonly bowel obstruction, hypercapnia, gas embolism and pneumothorax.

Inguinal hernias are divided into Direct and Indirect Hernias. Direct hernia occurs through the Hassalbach's triangle, while indirect hernias occurs through the deep inguinal ring. Inguinal hernias may be acquired or congenital. Most adult hernias are considered as acquired, with weakness of the abdominal wall musculature. Majority of the paediatric inguinal hernias are considered congenital. During development, the testis descends from the abdominal cavity into the scrotum which occurs at around the 3rd trimester of pregnancy. This descent is preceded by the Gubernaculum which passes through the inguinal canal and becomes the processus vaginalis. At around 36 -40 weeks of gestation, processus vaginalis closes and thus obliterates the opening in the peritoneum[13]. Failure of this closure results in Patent Processus Vaginalis (PPV) and thus leads to the formation of Indirect inguinal hernia. In a study of nearly 600 adults undergoing laparotomy, 12% had PPV, but still had no features or symptoms of hernia. Thus a PPV is not always associated with hernia, but can predispose to its formation later. Several studies have demonstrated that strenuous exercise predisposes to herniation.

A study by Dr Abid Ali Mirza, Dr Alfred J Augustine, Dr Shibumon M M atDepartment of General Surgery, Kasturba Medical College Mangalore , India compared the techniques of mesh placement in Lichtenstein Tension free Hernioplasty and Laparoscopic approaches i.e Totally extraperitoneal repair and Transabdominal Preperitoneal repair. The results of their study show a recurrence rate of 5% in the laparoscopic arm and 2.5% in the open arm. The comparison of the recurrence rates did not show any statistical significance (P value = 0.188). The incidence of persistent pain was a significant finding of this study. The incidence in the laparoscopic arm was 3.5% while the open arm showed a significantly higher rate at 16.5%, (P value = 0.00).

In another study named "Comparison of postoperative short-term complications after laparoscopic transabdominal preperitoneal (TAPP) versus Lichtenstein tension free inguinal hernia repair: A randomized trial study" by Kargar S, Shiryazdi S M, Zare M, Mirshamsi M H, Ahmadi S and Neamatzadeh H, pain was the most common symptom in both groups. The TAPP group patients had significantly less postoperative pain than the Lichtenstein group($p<0.05$). TAPP group also had lower incidence of hematoma (TAPP, 6.6% vs. Lichtenstein 13.3%; p=0.67), seroma (TAPP 10.0% vs. Lichtenstein 13.3%; p=1.00) and infection (TAPP 0 vs. Lichtenstein .6%; p=0.67). However, no differences between the two groups were found in terms of postoperative complications. In TAPP group mean of hospital stay was significantly lesser than Lichtenstein group (TAPP, 8.13 ± 2.19 vs. Lichtenstein, 13.15 ± 1.5 days; $p<0.001$).

In another study named "Comparison of open and laparoscopic preperitoneal repair of groin hernia" by Li J, Wang X, Feng X, Gu Y and Tang Rin 1,760 patients (530 open and 1,230 laparoscopic),

patients in the open group were found to be older than laparoscopic group ($p < 0.001$). More bilateral (91.45%) and recurrent (82.12%) hernia patients underwent laparoscopic procedures ($p < 0.001$ and $p = 0.00$, respectively). The overall recurrence rate was 0.71% and no significant difference was found between the two procedures ($p = 0.227$). The overall complication rate was lower for the laparoscopic than the open approach (14.47 vs. 19.25%, $p = 0.012$), whereas the rates of life-threatening complications were similar (1.51 vs. 0.98%, $p = 0.332$). The laparoscopic group had significantly lower incidence rates of wound infection and chronic pain ($p = 0.016$ and $p < 0.001$, respectively), shorter operative time, lower visual analogue scale scores, and faster recovery than the open group ($p < 0.001$).

In "Meta-analysis and review of prospective randomized trials comparing laparoscopic and Lichtenstein techniques in recurrent inguinal hernia repair" by Pisanu A, Podda M, Saba A, Porceddu G and Uccheddu A, seven studies of laparoscopic and Lichtenstein techniques were compared. Overall 647 patients with recurrent inguinal hernia were randomized to either laparoscopic repair (333, 51.5 %, transabdominal preperitoneal approach, TAPP and totally extraperitoneal approach, TEP) or anterior open repair (314, 48.5 %, Lichtenstein operation). Patients who underwent laparoscopic repair experienced significantly less chronic pain (9.2 % vs. 21.5 %, $p = 0.003$). Patients of the laparoscopic group had a significantly earlier return to normal daily activities (13.9 vs. 18.4 days, SMD = -0.68, 95 % CI = -0.94 to -0.43, $p < 0.000001$). Operative time was significantly longer in laparoscopic operations (62.9 vs. 54.2 min, SMD 0.46, 95 % CI 0.03, 0.89; $p = 0.04$).

Materials and Methods:

This Observational Cohort study was conducted at surgical wards of Medical College Hospital, Thiruvananthapuram. All patients who underwent open or laparoscopic hernia repair in the surgery department of Government Medical College Hospital, Thiruvananthapuram for a period of one year from March 2015 to February 2016. All patients above the age of 18 years with a clinical diagnosis of inguinal hernia for whom surgical management was judged appropriate and were willing for surgery. Age less than 18 years, Patients with factors predisposing to recurrence such as chronic cough, ascitis, previous hernia surgery, Patients who were not willing to give consent were excluded from the study. Sample size was calculated using the formula for difference in proportions, $n = \gamma_{+1/} \gamma_{(} z\alpha/2+z\beta_{)}{}^2 pq/d^2$ where d is the precision which is 20% of p and the confidence interval is 95%. Study group: Control group = Laparoscopic hernia repair: Open hernia repair = 1:3. Applying these to the above formula, sample size of study group = 44. Sample size of control group becomes 44×3 = 132. Laparoscopic Hernia Repair - 44. Open Hernia repair - 132. The study was done for a period of one year after obtaining ethical committee clearance. Data were collected verbally and by the physical examination of the patients. Data were entered in Microsoft excel software and was analyzed using appropriate statistical software- SPSS.

Results:

Age group

The average age of open repair patients was found to be 52.02 years with a standard deviation of 13.82 and that of laparoscopic repair was 49.36 with a standard deviation of 14.04. 32.6% of open repair patients were more than 60 years of age while 27.3% of laparoscopic repair patients were less than 40 years of age. No significant difference was obtained from the two groups in terms of age of the patients.

Gender

97% of patients that underwent open repair were males while 100% of patients that had laparoscopic repair were males. P value was found to be 0.24 and hence no significant results were obtained.

Duration of hernia

47.7% of patients that underwent surgery had symptoms of less than 1 year duration. Only 20.5% of open repair and 15.9% of laparoscopic repair patients had symptoms for more than 3 years. No significant difference between the two age groups were obtained.

Preoperative pain

35.6% of open repair patients and 27.3% of laparoscopic patients had preoperative pain. 33.5% of patients that underwent the surgery had pain. No significant difference was obtained between the two groups.

Duration of illness and pain

41.2% of patients who had symptoms for more than 3 years had pain. Only 28.6% of patientswith a duration of illness of less than 1 year had pain. No significant results were obtained.

Type of anaesthesia

All the patients that underwent laparoscopic repair had General anaesthesia while 4.5% in open group had General anaesthesia . 82.6% had Spinal anaesthesia for open inguinal repair. P value was less than 0.001 and results were significant.

Type of surgery in open repair

92.4% of patients that had open repair underwent Lichtenstein mesh repair. Bassini's repair was done for 6 patients.

Table 1: Frequency and percentage distribution of samples according to type of surgery in open repair (n=132)

Type of Surgery	Frequency	Percentage
Lichtenstein mesh repair	122	92.4
Others	10	7.6
Total	132	100

Type of surgery in laparoscopic repair

65.9% of laparoscopic repair had TAPP repair. TEP repair was done in 25% of patients.

Table 2: Frequency and percentage distribution of samples according to type of surgery in laparoscopic repair (n=44)

Type of surgery	Frequency	Percentage
TAPP repair	29	65.9
TEP repair	11	25
NA	4	9.1
Total	44	100

Postoperative pain and type of surgery

18.2% of open repair had postoperative pain while 13.6% of laparoscopic repair had postoperative pain. P value was 0.49 and no significant results were obtained.

Table 3: Chi square association between type of surgery and pain

OP Pain	Type of surgery				total		χ^2	df	p
	Open Repair		Laparoscopic Repair						
	N	%	N	%	N	%			
Yes	24	18.2	6	13.6	30	17	0.482	1	0.487
No	108	81.8	38	86.4	146	83			
Total	132	100	44	100	176	100			

Post-operative swelling and type of surgery

6.8% of patients who underwent open repair had postoperative swelling while 2.3% had swelling in case of laparoscopic repair. P value was found to be 0.259 and hence no significant results were obtained.

Wound discharge following surgery

4.5% of open repair had wound discharge while only one case that underwent laparoscopic repair hadthe same. No significant results were obtained following the analysis.

Discharge from wound site 3 months after surgery
2 cases that underwent open repair had wound discharge after 3 months of surgery. No cases of laparoscopic repair had wound discharge following 3 months of surgery. No significant results were obtained.

Discussion:
The average age of the whole study was 51.35 years. Open repair had an average age of 52.02 years while 49.36 was the average age of the laparoscopic group. 32.6% of open repair group patients were above 60 years of age. 97% of open group and 100% of laparoscopic group were males. This was similar to the results obtained by the study of Li J etal. 47.7% had symptoms of hernia of less than one year duration. This shows that people are seeking early medical treatment for hernia. 33.5% of patients had a history of preoperative pain. 41.2% of patients who had hernia for more than three years had pain. All the patients who underwent laparoscopic repair were given general anaesthesia compared to the 4.5% in open repair. Thus complications of general anaesthesia such as deep vein thrombosis may be more common in Laparoscopic repair. Open repair cases were given mostly spinal anaesthesia and some had local anaesthesia. Lichtenstein tension free mesh repair was the most commonly done procedure in open repair while in case of laparoscopic repair, it was TAPP repair. Postoperative pain was more common in open repair compared to laparoscopic repair, but no statistically significant results were obtained.

Above mentioned results were in accordance with the studies conducted by Abid Ali Mirza etal(Lap 3.5% vs Open 16.5%), Li J etal, Pisanu etal (Lap 9.2% vs Open 21.5%), Heikkinen etal and Kumar S etal (18.1% of open repair). Postoperative swelling and wound infections were also common in open repair even though the results were insignificant. This was similar to the studies conducted by Kargar S etal and Li J etal. None of the swellings found following the surgery were associated with cough impulse and hence the cause of swelling must be postoperative seroma or hematoma formation. Number of days of hospital stay were comparable even though 9.8% of open repair had more than 6 days of hospital stay. These are in accordance with the studies conducted by Kargar S and et al and Pisanu et al. Two cases of open repair had wound infection even after 3 months of surgery. Although no significant results were obtained following the study, Laparoscopic hernia repair was found to be better compared to the open repair based on postoperative pain, hematoma, wound infection and duration of hospital stay.

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